

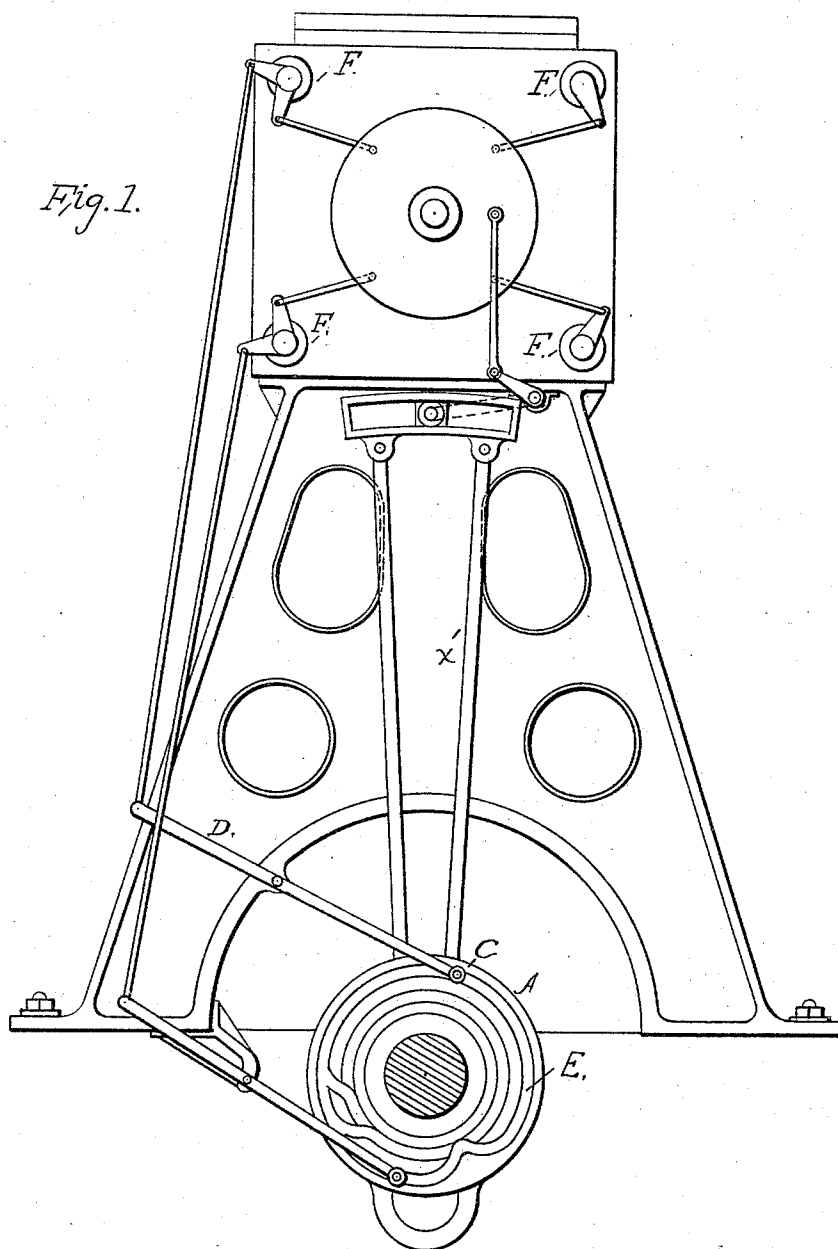
(No Model.)

3 Sheets—Sheet 1.

O. F. JONES.  
EXPANSION OR CUT-OFF GEAR.

No. 489,904.

Patented Jan. 10, 1893.



WITNESSES:

*L. A. Poole*  
*H. Morris Shum*

INVENTOR

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BY

*H. Ashton Ramsay*  
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(No Model.)

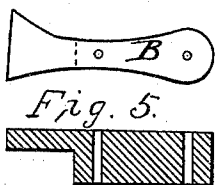
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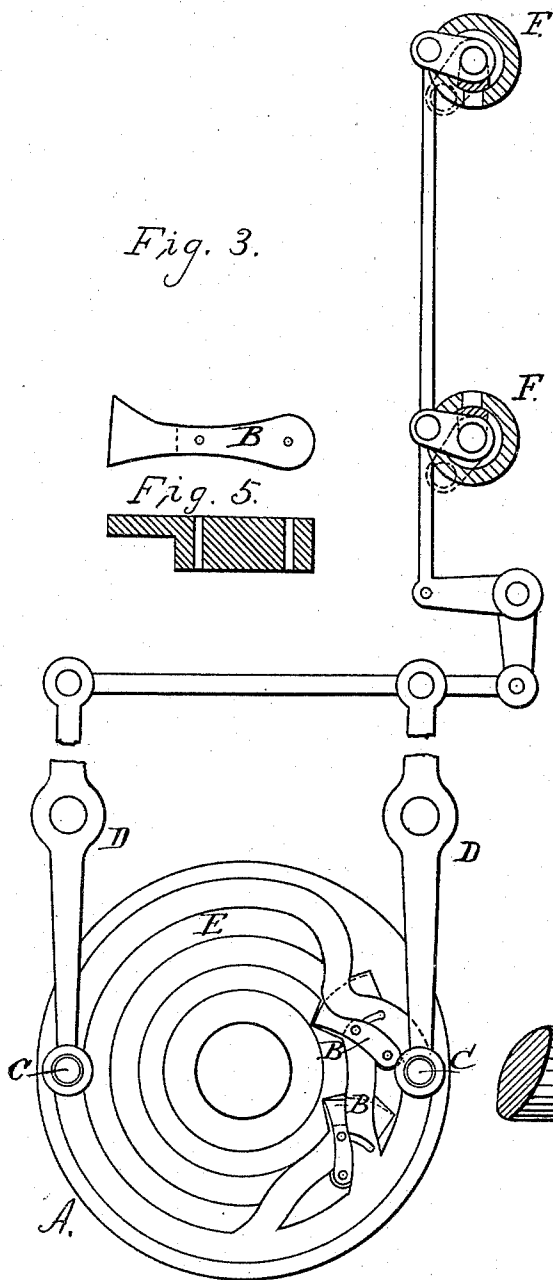
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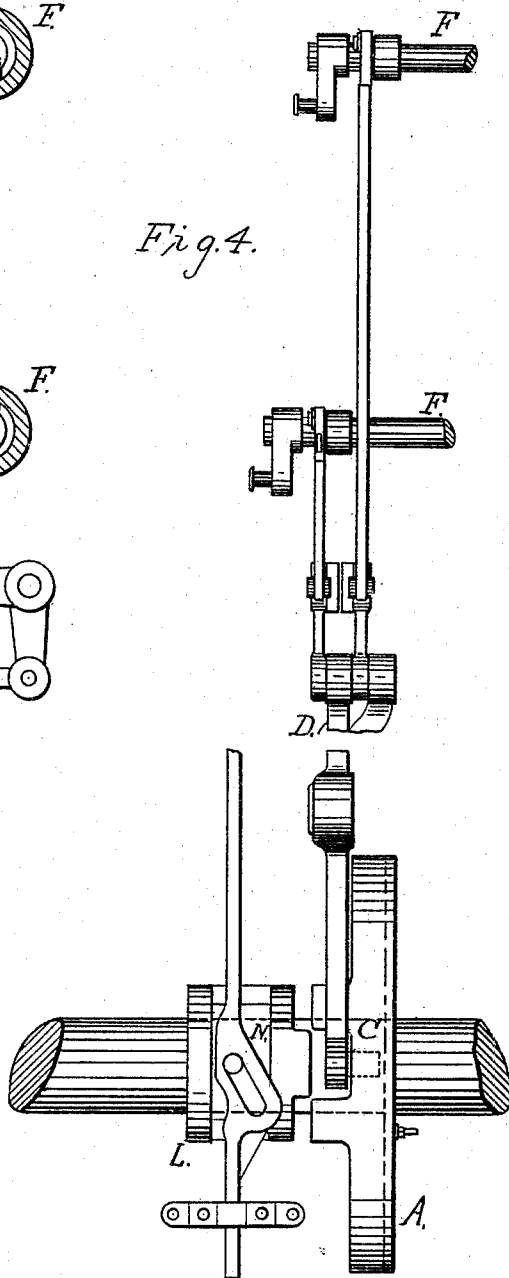
*Fig. 3.*



*Fig. 5.*



*Fig. 4.*



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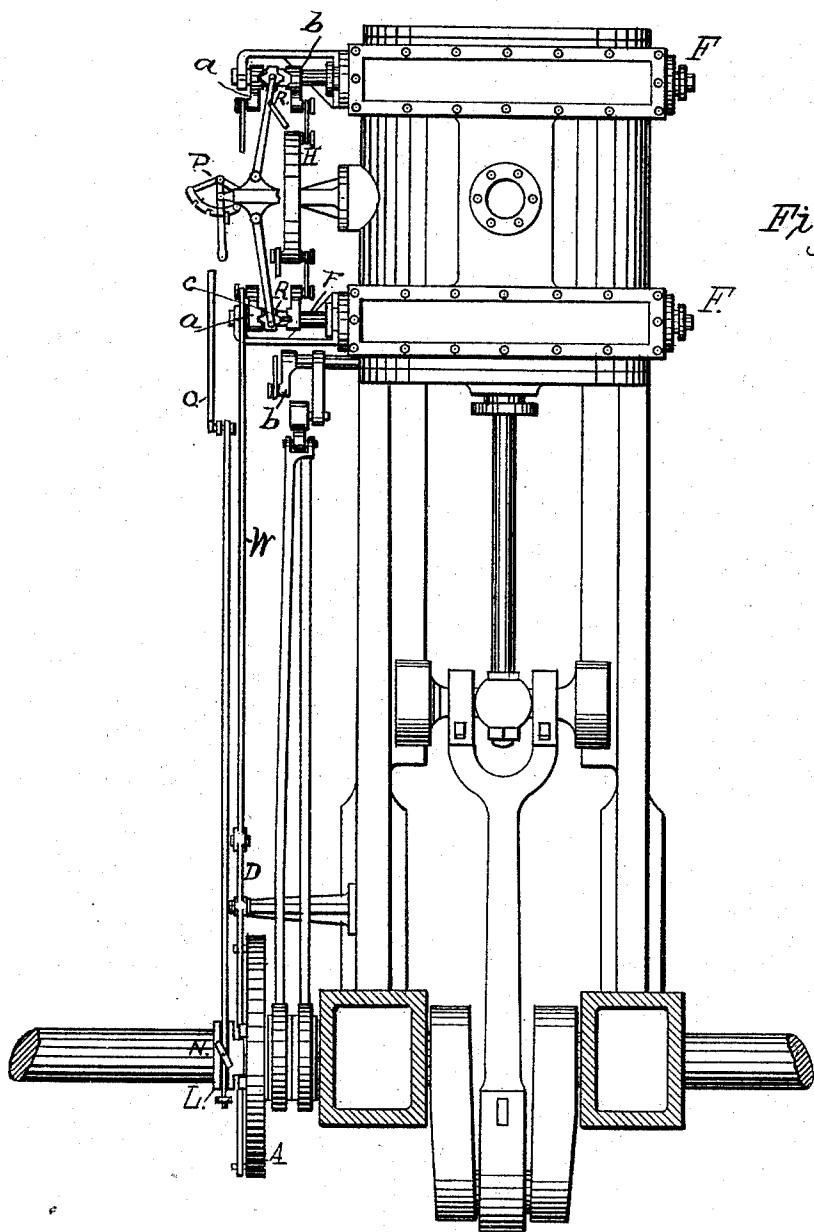


Fig. 2.

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# UNITED STATES PATENT OFFICE.

OWEN F. JONES, OF BALTIMORE, MARYLAND.

## EXPANSION OR CUT-OFF GEAR.

SPECIFICATION forming part of Letters Patent No. 489,904, dated January 10, 1893.

Application filed January 11, 1892. Serial No. 417,775. (No model.)

### *To all whom it may concern:*

Be it known that I, OWEN FREDERICK JONES, a citizen of the United States, residing in the city of Baltimore, State of Maryland, have invented a new and useful Expansion or Cut-Off Gear for Regulating the Admission and Suppression of Steam to and from the Steam-Cylinder of a Steam-Engine, of which the following is a specification.

My invention relates to improvements in mechanisms known as expansion or cut off gears, whereby the passage of steam to the steam cylinder and engine is at certain defined positions of the stroke of the piston suppressed thus allowing the steam before admitted by the main valve of the engine, to expend an expansive force against the piston without further assistance from the so-called "live steam" from the boiler. I attain these objects by the mechanism illustrated in the accompanying drawings, in which

Figure 1, is a general view in elevation showing the mechanism applied to the ordinary vibrating segmental valve known as the Corliss valve, Fig. 2, is another view of the same, Fig. 3, is a detached view of the cam or switch board, Fig. 4, another view of the switch board.

Referring to Fig. 1: This view represents an ordinary inverted vertical steam engine with vibratory valves, similar to the well known type of Corliss valves, in which the valves are caused to vibrate back and forth, thus alternately giving admission to and suppressing steam from the cylinder of the engine. It will be observed here that in the case of the Corliss type of valve and valve gear that the expansion of steam used in the engine is effected by disengaging the steam valves at the points where it is desired to cut off the steam and cause them to be brought back to their original position, relative to the steam port by weighted pistons dropping in dash pots, a method that has been proved satisfactory in engines making comparatively few reversals in a given time, but this system is not applicable to engines turning up to a great number of revolutions in a given time; my invention overcomes this difficulty as I do not trip or detach the valve, but always have the valve in rigid connection with the

cam disk or switch board, and the levers and rods on which it depends for motion.

The switch board "A" is a metallic disk, bored out to fit on a sleeve which works on any shaft having a rotary motion, a clutch I is caused to slide on a feather of the portion of the sleeve projecting through the eye of the disk, which is arranged to engage in a corresponding clutch on the switch board. On the face of the switch board, a series of grooves E are cut, provided with switches or shut offs. There is a roller S revolving on a stud affixed to the arm of a rocking lever D, which is caused to operate in and is guided by the aforesaid grooves, which by their eccentric curvature give an intermittent vibratory motion to the arm "D" which in turn operates the valve spindle H through the medium of the attached lever and connecting rod. As this expansion gear is intended to be entirely independent of the main valve gearing for operating the main and exhaust valve at full stroke of the piston, I have arranged the system as will be seen by the drawings, so I can at will detach the expansion gear, when the steam and exhaust valves of the engine are operated by a system of eccentrics, link motion and rods engaged on the wrist pins of the vibrating disks secured to the cylinder, in the usual Corliss method, and the engine reversed by well known methods of link motion or otherwise arranged to regulate the movement of the aforesaid valve.

I do not claim any novelty in the valves themselves nor in the gearing for operating the valves when the engine is working at its full stroke, nor of the method adopted for reversing the engine, except so far as it has to be modified to operate my expansion cut-off gear, as shown on the drawings attached herewith, and described in the aforesaid specification and description of the said drawings.

Having fully described my invention with reference to the accompanying drawings and ascertained the nature of this invention, and in what manner the same is to be performed, I would state that I have in setting out the nature of the invention shown certain special arrangements and connections of rods and levers for transmitting the intermittent motion produced by the cam or switch board,

and for purposes of illustration have shown the mechanism as applied to one particular type of steam engine. The movable sleeve clutch R, slides on a feather or long key *c* let  
 5 into and fixed to the steam valve spindles H. The two arms *a* and *b* are loose on the steam-valve-stems or spindles H. and vibrate freely without actuating the spindles and valves, unless engaged by the clutch on their faces  
 10 with the double sleeve clutch R. when motion is imparted to the spindle. For instance when the eccentric of the Stephenson link motion imparts motion to the disk *y*. and the clutch R. is moved over so as to engage the  
 15 arm *b*. the valve is actuated as in the ordinary Corliss motion, but when the clutch is moved back so as to release *b*. and engage the other arm or lever, the vibration of the disk will have no effect on the steam valve spin-  
 20 dles H. but will continue to operate the exhaust valve spindles as these arms or levers are keyed fast to the said spindles: but the steam valve spindles will now be actuated by the cam-disk through its connecting levers  
 25 and arm of the spindle, now engaged with the double-sleeve-clutch P. and thus be controlled by the eccentric remittent motion by the cam board turning on the shaft and actuating the arm D. I wish it to be understood however  
 30 that although the invention is applicable to this type of steam engine as illustrated and can be used with advantage, yet I do not intend to limit myself to these special things as it may be carried out in many ways and in  
 35 connection with different types of steam engines, without departing from its spirit and scope, and that it is susceptible of many modifications and will necessarily have to be varied in many ways to suit the various purposes and  
 40 conditions of its application.

I declare that what I claim in respect to the herein described invention, is:

1. The switch disk "A" with its series of grooves, adjustable switches or shut off "B,"  
 45 the rollers "C" revolving around a stud fixed to the arm "D," which is given an intermittent vibrating movement by the revolving disk, thus moving the roller confined in the grooves E, the said arm having connection  
 50 with and operating at its opposite extremity a connecting rod, which in turn gives motion to the valve F, all as described and for the purpose set forth.

2. In the expansion or cut off gear for op-  
 55 erating and regulating the steam valves of engines whereby an intermittent action of the valve is produced, the mechanism hereinbefore described, consisting of a revolving disk "A," provided with cam grooves having

a rotary motion, which is translated into a 60 vibratory motion, on an arm or lever "D" by the revolving movement of the disk, carrying the roller and stud affixed to the arm, and thus rocking it on a fixed fulcrum, and carrying at the other end of the lever a connect- 65 ing rod, which operates and gives a vibratory motion to a vibratory steam valve, intermittent in its action.

3. In the expansion valve gear of a steam engine, the revolving disk "A" constructed 70 with a series of curved grooves, and switches so arranged that they form a path to carry a roller attached to the arm of a lever, and thus produce vibratory intermittent motion, which is conveyed by means of a connecting rod at 75 the other end of the arm D, to the arm of the steam valve stem, or spindle, giving it the requisite motion for, first opening the valve at the commencement of the stroke of the piston, and secondly, closing at the point de- 80 sired to cut off the steam as shown and described.

4. The combination of the "cam disk," with grooves cut into the face thereof, the switch 85 for affording communication with other grooves as may be desired, the roller revolving on a stud affixed to an arm and confined and directed in the aforesaid grooves, and by traveling in the path guided by the said grooves producing a vibratory intermittent 90 motion which is transmitted by connecting rods and levers to the spindle of a steam valve, substantially as shown and described.

5. The combination of the eccentric link motion X, operating the wrist plate H, and 95 loose arms *b*. on valve spindles F, with the cam disk A, rocker arm D, the connecting rod W; the arm *a*, embracing the cam spindle F, and the double sleeve clutch sliding on a feather on the valve spindle, whereby either 100 valve arm can be connected to the valves to operate the same, substantially as shown and described.

6. The combination of the eccentric link motion "x" operating the wrist plate H and 105 loose arm *b* on valve spindles F, with the clutch sliding on a feather on the valve spindle F, whereby, by shifting the clutch to engage the corresponding clutch face on loose arm *b*, the valve is operated, or by disengaging the 110 clutch, the valve is released and the engine stopped substantially as shown and described.

Baltimore 24th December, 1891.

OWEN F. JONES.

Witnesses:

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 FRANK H. LONGFELLOW.